Central Intelligence Agency

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DIRECTORATE OF INTELLIGENCE

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China's Space Program: Future Developments and Commercial Sales

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SUMMARY

The Chinese have embarked on an ambitious space launch program which, if successful, will meet domestic needs and may generate foreign currency earnings of $100 million in 1988 and $500 million per year by the mid-1990s, through sales of launch services. On the basis of established practices in other Chinese defense industries, hard currency earnings from Beijing's space marketing campaign will probably help underwrite improvements in China's ballistic missiles. China's space industry is 10 to 15 years behind the United States, Europe, and Japan in technology, but it has the capacity to launch many more satellites than Beijing plans to launch for domestic programs.

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This memorandum was prepared by Office of Scientific and Weapons Research, and Office of East Asian Analysis. Information available as of 29 September 1986 was used in its preparation. Comments and queries are welcome and may be directed to the Chief, International Security Branch, OEA,

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Capitalizing on NASA's Problems

To take advantage of excess capacity, the Chinese entered the space launch services market in April 1984 and accelerated their efforts shortly after the Challenger disaster in January 1986. China has signed launch agreements with a US corporation and Sweden and is negotiating agreements with Canada, Great Britain, Brazil, Iran, Pakistan, and some African countries.

- Beijing probably will sign a $27.5 million contract with Western Union by December for a March 1988 communications satellite launch and an option for a second launch at the same price. 25X1 25X1

- The Chinese signed a $4 million contract earlier this year to place a small Swedish satellite into low Earth orbit as part of a dual payload with a Chinese satellite in October 1988.

- Beijing is also negotiating with a religious organization based in Florida for launch of two satellites that, the group is attempting to buy from the Communications Satellite Corporation. 25X1

- The most widely publicized contract--with the US Teresat Corporation--may not lead anywhere. Teresat has not made scheduled payments and does not own either of the shuttle-recovered satellites it proposes to launch. 25X1 25X1

Few Dangers of Technology Leakage

The launch of a US satellite undoubtedly would give China's marketing program a boost because US firms would require that the Chinese launchsite essentially meet US standards. The Chinese would gain little new technology, however, if they launched Western commercial satellites of standard design--such as those being considered in discussions between US companies and the Chinese:

- The mechanical and electrical connections between the satellite and launch vehicle would not involve sensitive technology.

- US checkout equipment taken to the launchsite will be under US control and will be removed after launch. Furthermore, the Chinese could not gain sensitive technology merely by observing the equipment in operation. 25X1

In addition, the Chinese could not exploit the satellite itself, unless it were out of US control for an extended period:

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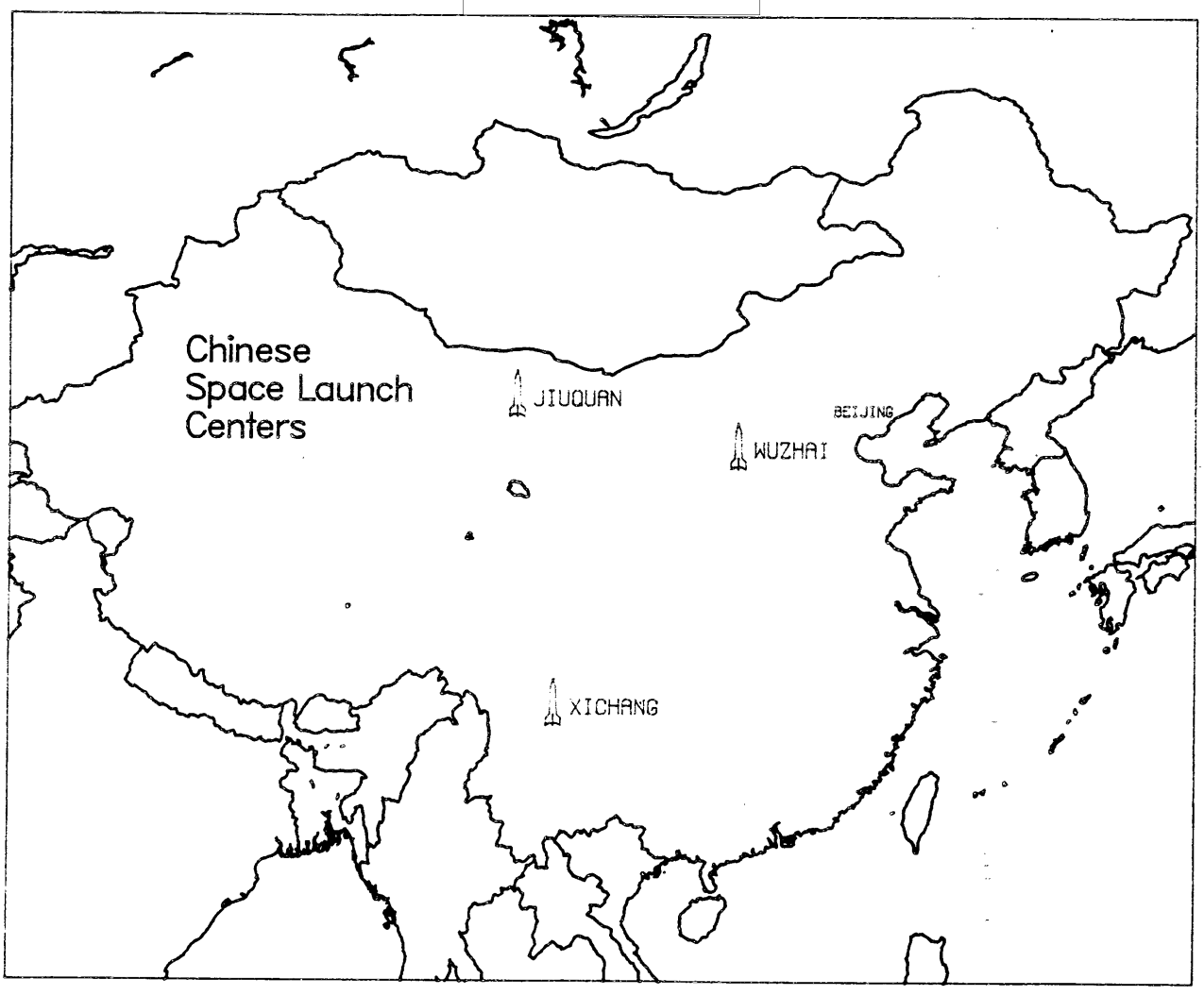

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- The Chinese would not obtain sensitive technology by photographing or examining an intact US satellite. 25X1 25X1[1] 25X1

An Impressive Capability

We estimate that China has the facilities to provide foreign customers 10 to 20 launches per year by the 1990s. China is capable of launching up to six geostationary satellites per year from Xichang (Songlin) and from six to 12 satellites per year into low Earth orbits from two pads at Jiuquan (Shuangchengzi). In addition, the Chinese might use facilities at Wuzhai for one or two polar launches per year. 25X1

Chinese Space Launch Facilities

Xichang--China's newest space launch center--consists of a single pad and gantry with associated support facilities designed for geostationary satellite launches. It was completed in 1983 after 12 years of construction and was first used in January 1984. 25X1 25X1 25X1 In addition to geostationary satellites, the facility could be used to place heavy satellites into low Earth orbits and could also support full-range ICBM testing to the Pacific Ocean. 25X1

Space launch facilities at Jiuquan consist of two opposed pads and service towers with a centrally placed, moveable gantry to support satellite launches and ICBM testing. Construction at Jiuquan began in the mid-to-late 1950s with Soviet assistance. Beijing launched its first satellite (1970) and all subsequent low Earth orbit missions from Jiuquan. 25X1

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Beijing has three space launch vehicles, the CZ-1, CZ-2, and CZ-3,[1] and, according to Chinese publications, plans to improve each with technology now available in China.

[1] Beijing also refers to these space launch vehicles as Long March 1, 2, and 3. 25X1

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- Their most frequently used space launch vehicle, the CZ-2, was derived from the CSS-4 ICBM. It was designed for low Earth orbiting missions and can place up to 2,400 kg into a 200-km orbit. According to Chinese publications, China plans to increase this capability to 2,600 kg by using Western orbital insertion motors. We estimate that the Chinese have from two to five CZ-2s on hand. The CZ-2 has been successfully launched on at least 10 of 12 attempts and has not failed since 1979.

- China's newest space launch vehicle, the CZ-3, is a CZ-2 with a liquid-hydrogen, liquid-oxygen third stage and can place up to 1,500 kg into geostationary transfer orbit. It is similar to the European Space Agency's Ariane I or the US Delta rocket. We estimate that the Chinese have up to five CZ-3s available for launch. The CZ-3 failed on its first launch (January 1984), but succeeded in two subsequent launches.

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- Beijing's plans for liquid-propellant strap-on boosters for the CZ-2 and CZ-3. The CZ-3 with four strap-on boosters and an improved third stage should be ready by 1991 and will have lift capabilities similar to the European Space Agency's Ariane IV.

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- Their oldest and least expensive launch vehicle, the CZ-1, was derived from the CSS-3 ICBM and can place up to 300 kg into a 440-km orbit. According to Chinese publications, a new version will have a larger third stage and modestly improved performance. The CZ-1 was successfully launched on two of two attempts--in 1970 and 1971.

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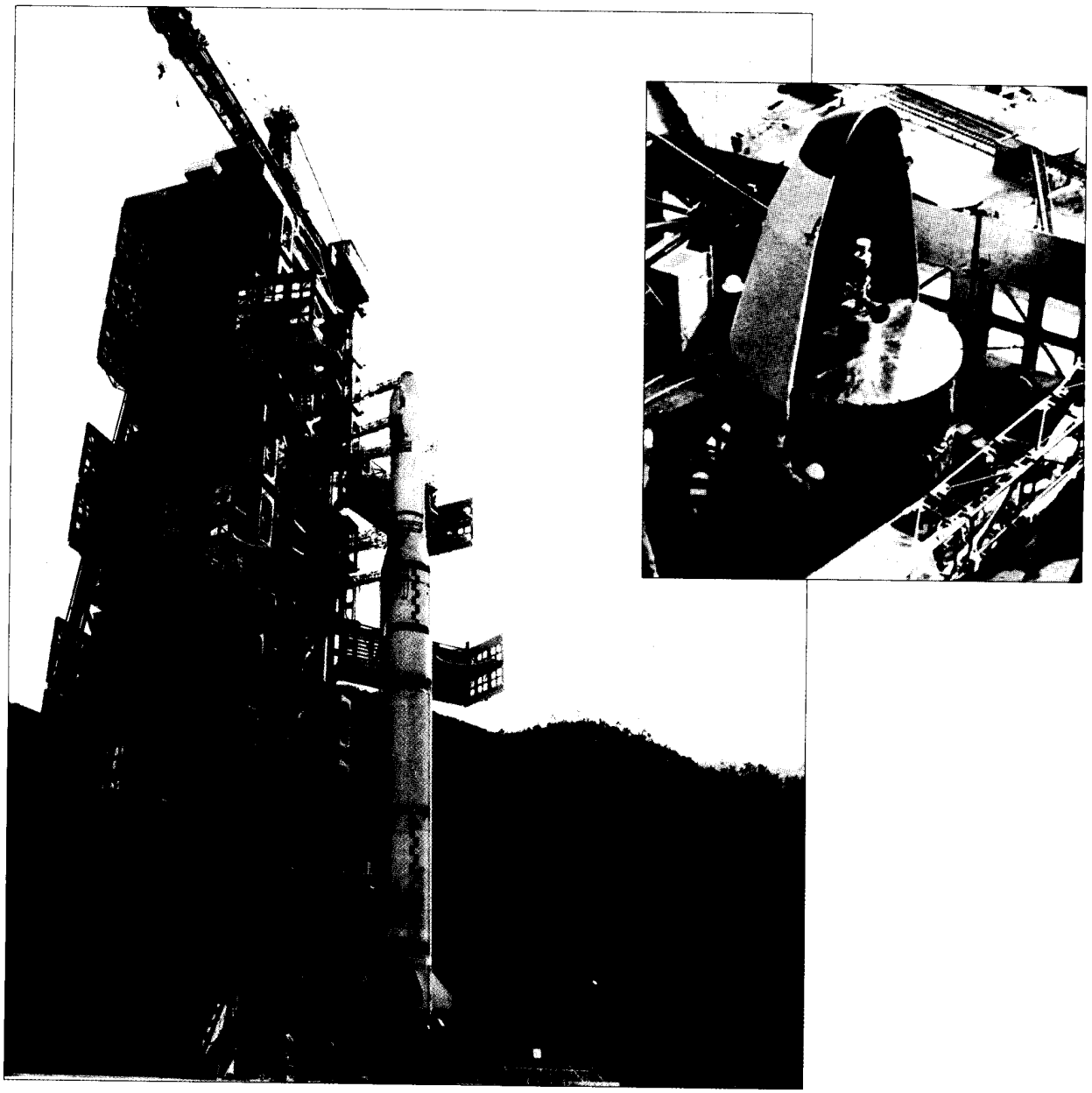
Figure 3
Chinese Satellite Launch



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Outlook

We expect the Chinese to be successful in their bid to enter the launch services market. Chinese prices are highly competitive--at least 15 percent below those for comparable services from the European Space Agency or the National Aeronautics and Space Administration. If Beijing successfully meets its first few launch schedules and does not suffer a major failure that damages its credibility, there should be no lack of customers.

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we estimate that Beijing can build 12 to 18 launch vehicles per year. Given this capability, the Chinese should be able to launch a few foreign satellites in 1988, perhaps earning about $100 million, and earn about $500 million per year by the mid-1990s. Earnings will probably not greatly exceed this figure, however, because of a shortage of highly trained launch personnel in China. Launch crew fatigue and a shortage of experienced technical personnel have been reported factors in the slippage of scheduled European Space Agency launches.

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We believe that hard currency earnings from Beijing's space marketing campaign will help underwrite improvements in China's ballistic missiles. The ministries and industries that oversee China's space launch program are also directly responsible for the development of ballistic missiles. Beijing has reportedly promised its defense industries that each would be allowed to reinvest profits from foreign sales to develop modern weapons. In addition, the Great Wall Industrial Corporation--the chief agent for sales of launch services--is China's major purchaser of missile-related technology.

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